JPRS 82949

25 February 1983

West Europe Report

SCIENCE AND TECHNOLOGY

No. 138

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

JPRS 82949

25 February 1983

WEST EUROPE REPORT

SCIENCE AND TECHNOLOGY

No. 138

CONTENTS

SCIENCE TECHNOLOGY

TRANSPORTATION

BIOTECHNOLOGY

KABIGEN LOOKS FORWARD TO NEW LAW PERMITTING GENE PATENTS

Stockholm NY TEKNIK in Swedish 13 Jan 83 pp 1, 4-5

[Article: "First Synthetic Gene--Swedish Patent on Genetic Unit?"]

> [Text] Soon it will be possible to obtain a patent on living micro-organisms. In February the Riksdag will discuss a change in the law which would make that possible. KabiGen can be the first by applying for a patent for a bacterium with an entirely synthetic genetic unit. This is the first artificial gene in Sweden--built of 460 chemical building blocks. There is only one single example in the world. It has taken scientists one-half year to build. It is worth a fortune if it survives and functions. It is invisible to the eye. It will go into history as the first patent-applied-for micro-organism in Sweden.

That assumes that Sweden will get a modernized patent law in the middle of this year. According to the government's proposal it should be possible to also patent micro-organisms themselves.

Artificial Gene

At KabiGen in Stockholm they are creating the first totally synthetic genetic unit in Sweden. An artificial gene with 460 chemical building blocks, nucleotides in two spirals.

All that remains is to join the two spirals into a complete genetic code.

And hope that the new gene will live in its new surroundings--the nucleus of a common coli bacterium.

There it will direct the bacterium to produce an extremely expensive and rare growth hormone which will be one of KabiGen's specialties.

One Ton of Blood Plasma

The market is not great, but few things can be more expensive than today's production of growth hormone. It takes more than one ton of blood plasma as the raw material to produce one thousandth of a gram today. And there are several kinds of growth hormone needed.

If Kabi succeeds, bacteria culture with syntheric genetic units is going to do that in the future.

Behind Kabi's successes there have been great research and development costs.

"It is natural now that we should apply for a patent as soon as everything functions as it should," said Staffan Josephson. He is the leader of the research team which is developing the synthetic gene.

Changed Patent Law

It is possible today in several industrial countries to patent micro-organisms. The Swedish government's proposal to change the patent law is the latest example in the same direction.

It is not clear in which countries Kabi is going to apply for a patent for its totally synthetic gene. Kabi is using an American patent for producing other growth hormones. But the new synthetic gene is their own Kabi development.

No Comment

Also at Fortia-Pharmacia in Uppsala they have come a long way with a new micro-organism which could be a commercial success. Scientists from Uppsala University are also participating in this development work. But in Uppsala they are extremely reticent about the future.

"No comment," is the answer from Fortia-Pharmacia to a question about a possible future patent.

In order for such a patent to be recognized, the one applying for the patent must retain living proof at some international deposit laboratory for 30 years. From there, competitors and other interested parties will have the right to request test samples for comparison.

The possibilities to evade patent protection cause certain companies to be doubtful of the value and the cost of patenting micro-organisms.

"The patent protection is poor," said docent Kurt Skagius at Fortia-Pharmacia in Uppsala.

The new proposal for changes in the patent law will, according to plans, be dealt with by the Riksdag in February, to go into effect at midyear. Then

Swedish legislation on this will be similar to that in most other industrial nations.

Patent Office Decides

In September 1981 the European Patent Office began to issue patents on new laboratory organisms.

Recently the United States Supreme Court approved a patent application for new organisms which were created by hybrid DNA technique at Stanford University.

In Sweden the government proposal for a new patent law was worked out without any general discussion. Not even the hybrid DNA delegation which the government itself created a few years ago was consulted.

In the future the government wants to place heavy responsibility on the Patent Office. It is there that the decision will be made whether it will be possible to patent living organisms in Sweden.

Lept Living for 30 Years

It is not fully clear what is meant by living organisms. It will also be the role of the Patent Office to keep track of what is happening abroad and adapt the legislation to that.

An important requirement in the new proposed law is the duty to deposit patented micro-organisms in one of the international laboratories which maintain storage. There the new micro-organisms will be kept alive and unchanged for at least 30 years, as long as the patent lasts.

If needed, the specimens can be rejuvenated with identical organisms. But a problem arises if the organisms change their properties, or simply die. Then a patent that has been granted can become invalid.

Competitors and other interested parties can request test cultures for comparison from the international deposit laboratories.

"One can imagine it happening that one competitor will in this way get access to the special genetic units which make those organisms unique," said docent Kurt Skagius at Fortia-Pharmacia in Uppsala.

"If the competition then moves the unique genetic unit to a new type of organism and causes it to do the same thing as the previous one--has he then violated the patent rights, or has he on the contrary created his own patent possibilities?"

At the Ministry of Justice they are aware of the lack of clarity.

"We did not want to write a new patent law with details which could possibly be overtaken by developments before the printer's ink dried," said Erik Tersmeden at the Ministry of Justice.

"Developments within micro-biology are moving so fast. Therefore we must allow the Patent Office to create its own usage little by little.

"The important thing is that we are now preparing the way for patent possibilities for this new industry in Sweden."

New Regulations for DNA

New regulations for the use of hybrid DNA technique can be expected during 1983, besides the new possibilities which the government now wants to create with the new patent law.

How far can experimentation be carried with human genetic units?

A committee in the Ministry of Health and Social Affairs is working on that question. The committee should have been finished in 1982, but the work was delayed. The question has become critical through the rapid development of so-called gene therapy, which includes existing medical interference in human genetic material.

Is a new government authority needed which will be responsible for all management and control of hybrid DNA technique?

This question is being studied within the Ministry of Labor. Today authority over questions of hybrid DNA research falls under two different agencies: the concession authority for environmental protection and the delegation for hybrid DNA questions.

9287
CSO: 3698/160

BIOTECHNOLOGY

BELGIAN-AMERICAN PLANT-BIOTECHNOLOGY R & D COMPANY FOUNDED

Brussels KNACK in Dutch 8 Dec 82 pp 22-24

[Report by Frank de Moor: "Searching for New Plants; Plant Genetic Systems, a World First."]

[Text] While the laboratories are being readied in Ghent, in the heart of the old university town, the first European -- in fact Flemish-American -- research and development company in biotechrology will be established in Brussels in the next few weeks. It will be active in the genetic cultivating of plants. Thus Plant Genetic Systems, Inc. (PGS) is getting its definite form immediately.

PGS was founded at the beginning of this year with an initial capitalization of 10 million francs by the Regional Investment Company of Flanders (GIMV) in order to allow Innovi, the broker between knowledge and capital (and especially its deputized manager, Jos Bouckaert) to turn the pioneering work in /genetic engineering/ of plants of the Ghent-Brussels (RUG-VUB) [State University of Ghent-Free University of Belgium] professors Jozef Schell and Marc Van Montagu into profit and develop it into an international framework. After 2 years of traveling and negotiating the time has now come.

If everything is cast into the necessary legal form on schedule, the capital of Plant Genetic Systems will be brought to at least 400 million francs by the end of the year. Not only the GIMV will see to that, but also a number of private partners who meanwhile have joined. These are the cattlefeed company Radar from Deinze, the Tiense Sugar Refinery, the American Advanced Genetic Science [AGS] and a European agriculture- and food company with whom negotiations have almost been concluded but whose name is being kept secret until they are finished.

However it may be, the capital of PGS will be 51 percent Flemish and that will be noticeable also in the composition of the board of directors. Just as important, if not more so, is the scientific advisory board, the so-called Scientific Board, on which this type of knowledge-company depends. Besides some researchers in the service of the American AGS, the Ghent biologists Schell and Van Montagu will also be seated on that.

Since the early seventies -- thanks to government support in the framework of the so-called /concerted actions/ between the state and the universities -- both of them, with their staff, have reaped world fame by applying a bacterium

(/agrobacterium tumefaciens/) as a vehicle (vector) to bring new genetic information to plants.

The Ghent team actually received the Franqui prize for that, in the person of Jozef Schell, who moreover went on to lead the famous Max Planck Institute in Cologne.

The fact that this RUG-VUB team developed that type of /vehicle/ did not pass unnoticed in the small circle of bio-engineering. Thus professors Schell and Van Montagu were included on the Scientific Board of the American AGS which will now become the American pillar of the transatlantic Plant Genetic Systems and which, moreover, certainly has some things to place on that /vehicle/. For example, thought is being given to a /gene/ which makes grain resistant to certain insecticides or which keeps potatoes free from disease.

AGS itself is half American through the chemical giant Rohm and Haas and half European through the Swedish Hilleshog. It was, moreover, founded in the same atmosphere and largely by the same intermediaries as the old Genentech, Cetus and Biogen. That does not mean, however, that the collaboration of AGS and the Flemish PGS is arriving too late. On the contrary. The (too large) number of bio-engineering companies ought to be restructured. Some, such as Biotechnologies, Inc. and Southern Biotech, are bankrupt while others, such as Genentech, are only now starting to get the full support of industrial giants like Corning Glass.

It appears that primarily the biotechnologists, whose knowledge can benefit agriculture and the food industry, are now getting underway. As the American publication POPULAR SCIENCE mentioned in May about the prelude to the 21st century, the genetic engineering of plants has only just started, but it is extremely promising.

Thus, for example, the International Union for the Conservation of Nature and Natural Resources calculated that in the year 2000 there will be almost 6 billion people -- twice as many as now -- but that one third of the world's agricultural arsenal will have been depleted by that time.

Hence it is expected from genetic plant cultivation that, as Professor Schell already explained in this paper on 7 May 1979, it yields new kinds of plants, for example:
--those which resist diseases, can grow at low temperatures, or under varying degrees of humidity, etc., or:
--those which would directly or indirectly fix nitrogen and thus would render energy-devouring nitrogen fertilization superfluous.

In this context, Plant Genetic Systems, Inc. will take on two types of assignments. On the one hand PGS will, at the request of certain companies for example, develop micro-organisms which can be of benefit to producers of seed, fertilizer or cattle-feed, and on the other hand it will, in consultation with the universities, develop its own products whose patents will remain the property of PGS, but which potentially can be converted into money through licensing agreements.

For that matter, the articles of association will have to clarify how PGS intends to protect its knowledge, even from its shareholders, in order to prevent it from

being bled and to prevent professors Schell and Van Montagu from taking the rap for that in our country.

If industrials indeed invest in Plant Genetics Systems, they will do so to have a window into the future and to cash in on a so-called /technologic dividend/ during the first years. Hard profits cannot be expected until later.

That is indeed also one of the reasons why a number of the companies originally interested in PGS, such as the Farmers' Union and Stella Artois, are not participating after all.

The man who arranged everything, apart from the representatives of Radar, Tiense and the GIMV, is Jos Bouckaert. When he started with the setting up of Plant Genetic Systems in London at the beginning of 1981, he already had experience with these types of structures. In the past years Jos Bouckaert inspired Louvain Research and Development (LRD), the pipeline between the KUL [Catholic University of Louvain] and industry. Thus he set up a number of knowledge-companies and in May 1981, as the deputy manager of Innovi, he became a broker in knowledge and capital on a broader base than that of Louvain.

The founding of Plant Genetic Systems is indeed one of the first meaningful steps toward the Third Industrial Revolution in Flanders, of which politicians and industrials talk a lot but for which the money is often lacking.

8700
CSO: 3698/133

ELECTRONICS

'ESPRIT' EUROPEAN PILOT R & D PROJECT GETS UNDER WAY

Brussels LA LIBRE BELGIQUE in French 4 Jan 83 p 14

[Text] Early this year, the EC [European Community] authorities plan to start implementation of the ESPRIT [European Strategic Program of Research on Information Technologies] project. This will be a pilot project, drawn up within the more general framework of a European strategy designed to close up the EC member countries gap in the field of research and development.

Seven major EC options have been laid down in a set of guidelines for a program that is to extend over the years 1984-1987 and will seek to: Improve the EC's competitive positions in the agricultural and industrial domains; improve its management of raw materials and energy resources; intensify aid to the developing countries; improve living and working conditions within the EC; and improve the EC's utilization of its scientific and technical resources.

In June 1982, the European Council selected information technologies as the domain requiring massive action on a crash basis, in that, from an R & D standpoint, it is these technologies that are indispensable to the restoration of European competitiveness on the industrial and innovational levels.

It is the Commission's intent that ESPRIT get under way gradually beginning in January of this year, during an initial phase in which pilot projects will permit the development of methods of cooperation.

To the promoters of this project, it is increasingly evident that a considerable portion of European R & D resources is being devoted to work whose objective is to close the gap that has developed with respect to what has been done elsewhere. Long-term research that could one day, in the Commission's view, move Europe into a position of leadership as regards products, is being neglected, owing, in large measure, to limitations on resources. The purpose of ESPRIT is to rectify this situation.

Checkmating Japan and the United States

ESPRIT's principal objective will be to provide European industry with the basic technologies it needs to enable it to compete on a sustained basis against Japan and the United States.

To accomplish this, the program must be centered on "precompetitive" technology and must involve agreement with the national authorities.

Given the scarcity of qualified personnel and other resources, which prevents firms and governments, each on its own, from covering all domains sufficiently in depth, ESPRIT's concentration on precompetitive research is intended to enable a crossing of the critical threshold in certain essential domains, while the carrying out of project work on a Community scale will provide the necessary technological bases for the development of standards of European origin.

Several big European firms have detached some 100 persons to work jointly within a steering committee and five technical groups toward defining the most suitable and implementable guidelines on which the immediate start of a first phase can be based.

The firms also intend to participate in the implementation of the program they have helped to define, and will help finance it in part, by furnishing the necessary installations and qualified personnel. Other organizations, such as universities and research institutes, will also be invited to take part in the project.

Ease of Use and Reliability

According to the promoters of the ESPRIT project, the general trend in the information technologies sector is unmistakably toward providing the final user with services more capable of forming a whole with their working environment.

This, in turn, calls for improvements of various sorts, with respect to both the ease of use and the reliability of systems.

Information technology systems must be better adapted to the needs of their users, must provide them with intelligent aid, and must make desired information available on a timely basis. Systems must therefore be capable not only of responding correctly to the question posed, but also of explaining the basis of that response, and, if necessary, of dialoguing with the user if the question posed was ambiguous or illogical.

These requirements necessitate a major qualitative break-through as regards the interfaces, processing capabilities and communication capabilities of these systems with appropriate data banks.

At the same time, the reliability of these systems must also be improved, since the user will be depending more and more on them in the course of his or her daily life and daily work.

These simultaneous improvements in ease of use, networking capabilities, and reliability will, in turn, demand a considerable increase in processing capabilities and innovative architectures.

The technology involved is called "advanced information-processing." The feasibility of these systems depends, in turn, in large measure on still larger-scale improvements in the domain of microelectronics and in softwares.

The two markets that loom the largest for these systems at around the threshold of the 1990's are in the domains of office automation and computer-aided production. These are the basic concepts that have governed the organization of the ESPRIT program.

Microelectronics: 'Super-Smart' Chips

The growing importance of VLSI [Very Large-Scale Integration] chips for any electronic equipment whatever makes it necessary to possess the design, production and testing capabilities they require, particularly in view of the the trend toward the production of customized chips. The cost and performance of systems depend on this technology, which is of vital interest for the information technologies sector as a whole.

The present 3- to 5-micron technology will be replaced by sub-micron technology, which will reduce energy consumption by a factor of 10 and multiply densities by 8. Costs will be reduced accordingly, while the tenfold increase in speed and the reduction in energy consumption will improve the performance of systems.

Japan and the United States have both taken a large lead in the VLSI technology domain. To meet them on a competitive footing, it is indispensable that Europe now work on the scale below 1 micron.

Commensurate with the reduction of chip area below 1 micron, the number of components it can contain increases to as many as 100,000, and even to 1 million components on the same single chip.

This CAD [computer-aided design] technique necessitates an approach that is different, structured and hierarchical, permitting the problems involved in the processing of a given mass of information to be resolved into more easily resolvable sub-problems.

Data banks, as well as standards for them, will have to be designed to handle this structural information. A qualitative improvement in CAD techniques is needed if full advantage is to be taken of VLSI technology.

Software Technology

Software is taking on growing importance. The applications market is growing at the rate of 49 percent per year, and that of systems software at the rate of 32 percent per year. Computer-assisted production, including graphics systems, standard softwares for large computers, ready-to-use special-purpose systems, management applications, microcomputer softwares and softwares for the publication of documents are some of the many domains that are developing very rapidly.

The production of software is a very costly activity in terms of both capital and sufficiently qualified labor; it is also very difficult to manage efficiently. It is important, however, to have available at the proper time the necessary software to support development in other high-technology domains that are dependent upon information technologies, in that of office automation, for example.

Software quality will have a decisive influence on the cost and competitiveness of European products and applications in the field of information technology.

Cooperation and exchange of information must be promoted among equipment builders, software firms, users and universities.

To be effective, such cooperation will necessitate the putting in place of standardized software interfaces.

The R & D program will include work on the scientific bases of software technology and will lead to the practical application of formal methods for the production of programs and of demonstrably exact systems.

The tools and techniques of development, together with formal methods--whether they be those involved in industrial development, requiring large teams of engineers specialized in software, or those designed for use by engineers in the devlopment of individual applications--will give software development an engineering base.

In the case of software in automated technical environments, the problem of its integration throughout the different phases of its life cycle is first and foremost an objective of long-term research.

To this end, a theoretical basis of unification is indispensable. Computer-aided management of the software life cycle will be developed that will integrate its technical development and the decision-making process in its business operations environment. This will require studies of models of the product life cycle, of the roles of those charged with developing the product and of its users, as well as examination and classification of influencing factors.

The results will be applied to prototype management systems, from which they will be extended to smart management systems.

The results of this research will be of definite interest to large and small enterprises as well as to general users. This will require, in the last resort, a complete set of technical standards and official regulations, as well as a unified code of concepts and descriptive information.

As the first stage in this process, emphasis is presently being laid on joint tools, formal methods, program conversions and information management. These facets require a modern data-exchange network to provide communications among the partners, with remote machine connection capabilities and file-transfer protocols.

Advanced Processing of Information

By the end of the decennium, in a fully expanding market, the different applications of information technologies--commercial, technical and office automation--will rest in large measure on the processing of known information at the same time as that of information gathered directly by way of a vast range of sensors.

The object of this research program is the industrial exploitation of advanced information-processing in Europe. Research must also be done on the engineering of storage and use of information and know-how, of signal processing and external interfaces, as well as of innovative computer architectures.

Research on the engineering of information and know-how will lead to the development of adequate forms of representation of know-how, of methods enabling the deduction of facts on the basis of data, and of inductive as well as deductive reasoning techniques.

Efficient new equipment and software architectures will undergird systems based on know-how. A technique for the design and operation of smart systems will be developed.

In the domain of external interfaces and signal processing, research will be done on algorithms and architectures for signal analysis, on diagram-matching techniques, on scenic and kinetic analysis, on the recognition of shapes, and on inspection and interpretation of images.

Natural systems will be studied from the standpoint of their pattern recognition and interpretation capabilities. Interfaces, languages and a software technology will be developed for the storage and use of information and know-how, with a view to the creation, distribution and compartmentalization of know-how data bases.

Research on innovative architectures will be centered on data-base machines, highly parallel-runnable ultrarapid computers, data-circulation machines, inductive-reasoning machines, and highly parallel-runnable, nonprogrammable units.

Office Automation

Office automation is expected to become information technology's principal market. In the United States, IBM and Xerox are each spending more in this domain than European industry and universities combined, and the Japanese "fifth-generation-computer" concept is also directed toward these applications.

The definition and pursuit of objectives in the office automation domain is heavily dependent on local cultural conditions. In this context, the related architecture and software require major attention, and an effort must be devoted to the man-machine interface.

This effort must bear particularly on the creation of centers for the preparation and distribution of documentation; on video-integrated text-voice-image communication, with features enhancing its usefulness; on the storage, accessibility and the searching out of know-how rather than of the data stored within the system; and on all aspects of intelligent interaction between man and machine.

Communication is the key element of office automation systems. It not only creates additional processing needs, but also has the effect of putting disparate systems in contact with each other, so that standardization take on paramount importance.

Computer-Aided Production

Computer-aided production systems require systematic integrated computerization of the production process. These systems will integrate computer-aided design (CAD), computer-aided manufacturing (CAM) and computer-aided engineering, testing, repairs and assembly, all linked by means of a common data base.

European manufacturing industry as a whole--large, medium and small enterprises alike--will benefit from these systems.

The integrated-system architecture and software development in general are the two central elements of the required R & D effort. Machine control is another vital aspect, involving automated assembly systems, robotic systems, image analysis and computerized numerically-controlled machine tools.

Problems related to sensors and to microelectronic subsystems must also be resolved to enable the development of the necessary advanced-technology components. Planning calls for the creation of a certain number of pilot advanced-technology developmental centers to serve as test benches for the demonstration of advanced computer-aided production systems, so as to ensure that the recommended R & D program remains correctly oriented toward the objectives being pursued.

The new-generation computer-aided production technology will also permit users to introduce it into their activity on a gradual basis that is adapted to their specific needs and situation.

The European Dimension

Two reasons in particular militate for the undertaking of such a program on an EC-wide scale. One is the close relationship that links R & D, standards and markets, and the other is the considerable economy of scale engendered by a merging of R & D resources.

As regards standards, European industry is suffering from a lack of sufficient dimension to enable it to impose de fact standards, while the adoption of divergent standards by the different national authorities that provide it with guidance represents a second handicap.

Since the ESPRIT program is precompetitive and is laid out in terms of long-range objectives, it will induce the participants to bring forth joint anticipatory new standards, evolved, above all, within the Community and not imposed from without.

Thus, ESPRIT will reverse the present trend wherein research is dispersed and fragmented, and R & D efforts are being devoted mainly to recovering lost ground. Joint, long-term research will, on the contrary and in good time, yield gains that are essential to the development of new and competitive products; moreover, nothing during this stage will, on the other hand, prevent firms from competing with each other on the basis of products or systems deriving from any of the joint efforts involved. They will, however, have been spared otherwise dispersed and wasted efforts.

Europe will thus occupy a world market position based on its own innovativeness and at a technological level comparable to that of its competitors--theoretically, at least, since all of this, of course, is still in the planning stage--an advanced one, to be sure, but all the same, a planning stage.

9238
CSO: 3898/159

THOMSON-CSF PERFECTS SEMICONDUCTOR LASER DIODE PROCESS

Paris AFP SCIENCES in French 30 Sep 82 p 47

[Text] Substantial progress in the application of laser diodes to semiconductors--The central research laboratory of Thomson-CSF, which for a number of years has been studying the preparation of semiconductor materials for the production of optoelectronic components, especially those applied to telecommunications by optical fibers, has produced, with financial aid from government sources and financial cooperation from CNET, an original procedure for gaseous phase growth of a gallium-aluminum arsenide based material necessary to the preparation of these components, functioning at a wavelength of 0.85 of a micron.

This new procedure, called the reduced pressure organometallic method, permits the production of semiconductor lasers at a very low threshold, that is to say low consumption of power. The active component of these compositions, called a quantum well, is only six thousandths of a micron in thickness and is situated between two layers of a material with a slightly different composition and with a controlled refraction index which permits the emission of light and, at the same time, its guidance.

Threshold densities of current, measured in pulses at 22 degree centigrade, smaller than all that have been measured up to the present by other methods, have been recorded.

Expressed in square ampere-centimeters, these values, best when at a minimum, are respectively 230 A/cm^2 for optical cavity lenghts of 0.4 millimeters and 1.8 millimeters.

12230
CSO: 3519/247

EUROTECHNIQUE'S PLACE IN ELECTRONICS INDUSTRY DISCUSSED

Paris L'USINE NOUVELLE in French 16 Dec 82 pp 35-36

[Article by Jean-Luc Austin]

[Text] Three scenarios are possible, but it does seem that Thomson wants to reorganize its activity in integrated circuits, taking advantage of the synergy between the mass production know-how at Eurotechnique (which it will buy), and Efcis competence in circuit design.

After ten months of uncertainty, Eurotechnique, Saint-Gobain subsidiary specialized in the fabrication of integrated circuits, 49 percent of whose capital is held by the American company National Semiconductor, should finally learn its position in the electronics sector. The Thomson group is now getting ready to take total control of Eurotechnique by buying the shares of the two partners, a decision which it is difficult not to correlate with the nomination of Jacques Noels, currently planning director of the Thomson group, to the position of director of semiconductor activities at Thomson-CSF.

Jacques Noel is now responsible for Efcis (MOS integrated circuits), DCI (bipolar integrated circuits), the microwave components division, and video detectors (CCD circuits). He will undoubtedly also be in charge of instituting the orientations chosen by Thomson for Eurotechnique, once this company is definitely integrated in the group, a situation which should occur before the beginning of next year.

Three scenarios are possible for Eurotechnique's future (480 employees at Rousset, in Bouches-du-Rhone). In the first, Thomson can let Eurotechnique operate under the strategy with which it started, namely the mass production of highly commercial products, especially memories. The essential advantage of this approach being that this type of fabrication complements Efcis', which is rather oriented toward specific products. Unfortunately, the sale of memories implies a market and therefore a specific international network, which neither Thomson (whose international network is structured to sell systems, not components) nor Eurotechnique presently have. This choice would not give Eurotechnique many chances in the long run.

The second scenario is that Eurotechnique becomes a second Efcis. Its present activity would then be converted to specific areas such as CCD detectors for portable video cameras, whose outlets are essentially internal in the Thomson group. This would undoubtedly be the least effective solution. Eurotechnique's production capabilities would be muzzled, and it is hard to see how the French semiconductor industry could lose this potential, when the technical quality of Eurotechnique's plant is acknowledged by all, including Thomson. This solution would surely cause an exodus from Eurotechnique, Thomson's strategy being considered by some specialists as not adapted to the present market of electronic components. This phenomenon is the more critical since the technologic level of a semiconductor plant is often linked to several key men whose experience is essential.

Non-Negligible Chances to Enter the Free Market of Integrated Circuits

The third scenario is that Thomson reorganizes its integrated circuits activity, to take advantage of the synergy between Efcis' circuit design abilities and Eurotechnique's mass production competence. For Thomson, this implies a partial redefinition of Efcis' activity, and that of the departments for which Jacques Noel is responsible. In return, Thomson would have a production tool which would assure the internal needs of the group, but which would also allow it to enter with non-negligible chances the free market of integrated circuits, exceeding the critical level of 400 million francs in turnover, below which a semiconductor production unit is not viable in the present economic context.

Although it implies a shift in the former Thomson policy for integrated circuits, it is this last solution which appears to have the greatest chances for actualization. First, because it has the blessings of the government, which has always encouraged Thomson to approach more effectively the free market of electronic components; and secondly, because Jacques Noels' experience (until he came to Thomson, he was president and general director of Texas Instruments France) makes him a specialist in this "open" strategy. Thomson-CSF could thus fully play the role of industrial pivot assigned to it by the government.

11,023
CSO: 3698/171

SIEMENS TO INTRODUCE LINE OF ECL GATE ARRAYS

Paris ELECTRONIQUE ACTUALITES in French 26 Nov 82 p 21

/Text/ Siemens is ready to introduce in May 1983 a line of fast ECL gate arrays which is very similar to that of the RTC, although to our knowledge no negotiations between the two companies have taken place yet for a possible compatibility.

This series, called SH 100C, completes the 100B series in production at Siemens for the past several years. It is distinguished from the latter by an internal propagation time of 0.35 nanoseconds (compared to 0.5 nanoseconds) and by complexities ranging from 990 to 2,500 gates (900 gates maximum until now).

3 Models From Now to 1984

Other specifications specific to the SH 100C series include:
-ECL technology with oxide insulation (like the SH 100B series);
-maximum clock frequency of 350 megaherts;
-36 logical cells in the library, plus 6 input cells and 14 output cells;
-package of 64 pins or fakir (3 rows) of 144 pins;
-operating temperature from 0 to 75 degrees centigrade;
-consumption of 2 megawatts per gate.

As of May 1983, the SH 100C1 will be available with 36 cells/900 gates, a consumption of 2.5 watts, 2 interconnection levels and a chip area of 75 square millimeters.

In October 1983, the SH 100C3 will be available with 120 cells/2,500 gates, a consumption of 6.5 watts, 3 interconnection levels and a chip area of 75 square millimeters.

Finally, in February 1984, the SH 100C2 will be available with 24 cells/700 gates + 129 RAM /Random Access Memory/ bits (4 x 32 bits), similar to the existing SH 100B2, but with a chip area of 21 square millimeters instead of 36 square millimeters.

Siemens is currently studying the feasibility of using input cells in analog mode for a direct connection on lines with 560 megabits/second.

12204
CSO: 3698/141

ELECTRONICS

'SUPER ARRAYS' MADE WITH VAPOR-PHASE EPITAXY AT FRENCH LAB

Paris ELECTRONIQUE ACTUALITES in French 17 Dec 82 p 12

[Text] The Electronics and Applied Physics Laboratories (LEP) have just demonstrated the feasibility of structures of the super array or GaAlAs-GaAs multiple quantum-well types with very abrupt interfaces using a vapor-phase epitaxy procedure on the organometallics (EPV-OM).

Using the EPV-OM process, at atmospheric pressure, which is an easier process than molecular-jet epitaxy, the LEP has produced super array structures having rather similar characteristics. The width of the well can be reduced to 25 angstroms, while keeping an interface of less than 5 angstroms.

The growth procedure used employs trimethylgallium, trimethylaluminum and arsenide, with hydrogen serving as the catalyst gas. The deposit temperature is 650 degrees centigrade, the pressure in the reactor is 1 atmosphere, and the rate of growth is 5 angstroms per second. The wells are produced without stopping the growth between the layers of GaAs and the barriers of GaAlA's. The movement of the gases in the reactor was planned so that the composition of the gaseous mixture at the level of the substratum could be modified in a controlled manner in less than 0.1 second.

The structures obtained in this manner are characterized by their photoluminescent spectrums, measures at 4,000. The energy level of the peaks and their width are tied to the width and the shape of the quantum wells. Thus, the structure with four wells of different widths (30, 45, 70, and 100 angstroms) separated by GaAlA barriers made of 54 percent aluminum at 500 angstroms produces four peaks. The energy position of these peaks, which corresponds to the electron transition, heavy hole, is in perfect accord with the calculated position, supposing that the cells are rectangular. These results imply that the changing of the composition of aluminum (from 0 to 54 percent) at the interfaces takes place over a distance of less than 5 angstroms.

12230
CSO: 3519/247

BRIEFS

FRANCO-AMERICAN SEMICONDUCTOR COMPANY--Creation of a Franco-American semiconductor company. French and American investors have joined to form the "TEXET" Company. It will sepcialize in semiconductors for use in telecommunications, guidance systems, current regulators, and financial operations in France. Production, which could start about 18 months from now, will take place in two industrial centers, one at Saint-Michel-sur-Meurthe in the Vosges, with 300 employees and the other at Dallas, Texas. The French factory will take care of the wiring and the packing, and the Americans will produce the semifinished material. France retains 65 percent of the capital of "TEXET", distributed among PARIBAS, UAP, PROVIDENCE, and CHIERS-CHATILLON, and the administration will be directed by the Americans. [Text] [Paris AFP SCIENCES in French 30 Dec 82 p 37] 12230

DUTCH-GERMAN JOINT RESEARCH--Eindhoven, 9 Dec--Philips and the German Siemens will be doing long-term research together. Fifty researchers of the central laboratories of Philips and Siemens will coordinate their research efforts. The draft agreement comprises subjects such as new semi-conductor materials, submicro-technology, speech identification by computers, computer-aided design (CAD) and microelectronics. The two strongest electronic companies of Europe will thus initiate even better lateral bonds. Philips and Siemens are already working together in, amongst other things, the pressing of phonograph records (Polygram). Siemens has 30,000 researchers in its service and a budget for research and development (R&D) of 3.5 billion guilders. Philips has 24,000 researchers and an R&D budget of 3 billion guilders. Among the many collaboration agreements Philips already has --primarily with American companies -- this one is indeed special. Most of the other agreements are aimed directly at a product (with ATT on digital telephone exchanges, for example), while the agreement with Siemens is much less specific and aims at the long term. European collaboration in electronics is an important consideration. Especially the threat of the Japanese electronics industry has led to a number of initiatives in the European Community, including the so-called ESPRI program (European Strategic Program on Research in Information Technology). Philips and Siemens have both been involved in setting up this ESPRIT program. [Text] Rotterdam NRC HANDELSBLAD in Dutch 9 Dec 82 p 1) 8700

FRANCE, JAPAN ROBOTICS ACCORD--Tokyo--On 1 January, the Japanese economic newspaper, Nihon Keizai, reported that the first French-Japanese agreement in the area of industrial robotics was signed between Compagnie Electro-Mecanique (CEM) and Yaskawa Electric Mfg. According to this agreement, CEM will import into France large robots intended for assembly and transportation, bought from the foremost Japanese robot manufacturer, which it will then sell under its own name, the paper added. In turn, Yaskawa will sell in Japan small robots produced by CEM, and will cooperate with the French company to help it develop its production of large industrial robots. CEM will sell in France 20 robots produced by Yaskawa in 1983, and 100 in 1984, while the Japanese company will sell in Japan 200 robots produced by CEM, essentially to manufacturers of automobile electrical and electronic equipment. According to Yaskawa, the robots produced by CEM are fast and accurate, and can be competitive on the Japanese market, concluded Nihon Keizei. [Text] [Paris AFP SCIENCES in French 6 Jan 83 p 21] 11,023

CSO: 3698/171

FRG RESEARCHERS WORKING TO DEVELOP CERAMIC ENGINES

Hamburg DIE ZEIT in German 26 Nov 82 p 66

[Article by Heinz Guenther: "Light and Hot. German Researchers Are Trying to Remain Competitive Internationally"]

[Text] Bad news for Europe's automobile manufacturers: The Japanese have managed to get the first ceramic engine going, and the Americans are already submitting an engine made of synthetic materials to the harsh test of motor car racing.

The ceramic minidrive from the Far East might just be talked down as a sensational toy. However, there are no excuses for the "Polimotor" [polymor engine] from the Middle West. With a volumetric capacity of 2.3 liters and a power of 74 kilowatts (100 horsepower), this magic machine weighs only 80 kilograms, of which only 30 kilograms are metallic--namely, the cylinder surface, valves, cam- and crank-shaft. Everything else is made of glass-, carbon- and fiber-reinforced epoxy resins or of polyamide synthetic material.

The racing car drive was developed by Ford from a series production engine, and, as recently indicated by the auto giant, is supposed to be one half the weight, considerably less thirsty, and about 30 percent less noisy than the metallic original. If the engine were for sale it would cost approximately DM 70,000 at this time.

In Germany, the mother country of the automobile, the development engineers are pursuing less ambitious plans, for example, at the German Research and Development Institute for Air and Space Travel (DFVLR) in the Stuttgart Pfaffenwald [Parsons' Forest]. Here, they show visitors to the Institute for Design and Construction Research a muffled box in the backyard. Within this box Germany's first synthetic-material engine is puttering away: a single-cylinder diesel with 750 cubic centimeters volumetric displacement and 12.5 kilowatts of power at 3000 revolutions per minute. The only synthetic material part tested so far on this test stand is a piston pin made of carbon-reinforced synthetic material (technical abbreviation CFK). It weighs 60 percent less than its conventional metallic counterpart.

However, the first impression of hopeless backwardness as compare with the United States is misleading. In the neighboring hall connecting rods and

crankshafts are made of CFK are already running under continuous load test, that is, a completely synthetic drive train. The highest weight savings was achieved by the manufacturers with the connecting rod (270 grams as compared with 1.3 kilograms in the steel version). The CFK crankshaft--at hopefully equal loading--is more than half as light as in our present automobiles. A look at other laboratories and workshops in the Stuttgart Air and Space Research Center explains why the DFVLR is also working on a synthetic-material automobile engine. Here high-load capacity synthetic material varieties for aircraft, helicopter rotors, and rotor blades for wind power stations are constructed, manufactured and tested. And here as well they are going the ceramic route.

Thus, Engineer Richard Kochendoerfer, department head of the Institute for Building Methods and Construction Research, sees no competition between synthetic materials and ceramics, but rather an effective supplement: "Extreme load capacity synthetic materials such as CFK make it possible to reduce considerably the weight of masses in reciprocating motion in the engine, which also means bearings of smaller dimensions and overall more quiet operation."

"For cylinders and pistons," he adds at once, however, "we shall probably not be able to do without novel ceramics--precisely because of the high temperatures." Here the two nonmetallic materials could be combined. In spite of reports from Japan and the United States, Kochendoerfer considers it out of the question for combined synthetic material and ceramic automobile engines to appear in the marketplace "before 1990." However, he thinks the effort is pointed in the right direction.

A similar view is held by Professor Guenter Petzow, head of the Powder Metallurgy Laboratory in the Stuttgart Max Planck Institute for Metals Research: "The revolution in engine construction through a magic ceramic material will not occur for the time being." Teaching aids such as the one in Japan show "vividly the fitness of ceramic materials of construction," but Petzow considers the automotive industry to be still "very far away" from series manufacture of individual parts, much less of entire engines, in the foreseeable future.

Nevertheless, the metals scientist wants to follow this development route in a consistent manner, because the goal is an adiabatic--that is, a diesel engine operating without heat exchange as well as a hot gas turbine for automobiles, which in principle corresponds to the jet drives of aircraft: the extreme turbine temperatures of about 1500 degrees Celsius can only be mastered with ceramic parts. Important test parts for the novel drive unit have already been developed by the Munich firm Motoren und Turbinen Union (MTU) [Engine and Turbine Association].

Such ceramics (the Greek word ceramos = burnt earth) do not have much in common with the breakable porcelain in mother's china cabinet. Here we are dealing with chemical compounds of metals with oxygen, carbon, nitrogen, boron and silicon. The last remaining thing in common between archaic and ultramodern ceramics is brittleness. However, the Stuttgart metal researchers

hope to still eliminate this arch evil also by admixing powdery zirconium oxide to the material of construction. By means of this crack-absorbent system, they were at least able to increase toughness by 165 percent and rupture resistance by 260 percent.

An additional problem is the joint between ceramic and metal. The Stuttgart research group successfully tested a technique called diffusion welding as well as other new processes for coating metallic parts with ceramic surfaces. Nevertheless, Petzow does not believe in a rapid advance of ceramics into series production of enginess, "wear parts such as rockers and valve lifters or tappets have the best chances."

Here the experts of the Upper Franconian firm Annawerk in Roedental near Coburg are more optimistic. The first FRG enterprise for so-called non-oxidic ceramic materials already produces and tests an entire range of ceramic parts. Professor Ernst Gugel of Annawerk calculated that a metal-ceramic engine, chiefly because of its higher working temperature, could bring about an improvement in efficiency of "more than 20 percent." Related to the automobiles registered in the FRG, this would make it possible to save "4 billion liters of motor fuel per year."

This nice calculation, to be sure, is silent on the disadvantages of hot engines: at higher temperatures a drastic increase in lung-damaging nitrogen oxides is unavoidable. A --technical-- way out of the new danger is supposed to be complicated catalysts for exhaust gas purification which would first have to be developed. However, no mention of these environmental effects of synthetic ceramic drives is made in the Japanese and American studies either.

5586
CSO: 3698/110

SWEDEN R&D BUDGET INCREASE OF NEARLY ONE BILLION KRONOR

Stockholm SVENSKA DAGBLADET in Swedish 11 Jan 83 p 5

[Article by Leif Dahlgren: "Budget Appropriation is Increased by Almost One Billion"]

> [Text] "The investment that we are making in research and development is a bright spot in something which is otherwise rather dark," said Under Secretary for Research Kerstin Niblaeus, referring to abstinence in other parts of the budget.

"The purpose of research is to bring forth new knowledge, which was important when Sweden was developing from a poor country into a welfare state," she said further. "Sweden has difficult problems today, business and industry need renewal with the help of research. The investment in the new budget is an indication of our confidence in the scientists. But it also gives them a responsibility, when the government is forced to be so restrictive in other areas."

What is being invested in the coming year is almost one billion kronor beyond the 7.7 billion which is going to research this year. This can be seen as a confirmation of the new government's often announced ambitions to raise the priority of the area, as a link in the work to get Sweden on a strong economic footing again during the 1980's.

The amount of 760 million kronor is to be invested in development work within the industry, defense, and communications ministries. The amount of 210 million kronor will go to increased resources for research and science education (FoU). The increase in investment in FoU under the education department is 125 million kronor. The JAS [fighter-attack-reconnaissance aircraft] project increases research resources within the defense ministry by 470 million kronor. Agriculture gets 13.5 million kronor more, and the foreign ministry 11 million kronor more.

"Research is a 'protected area' which will get more money in an otherwise tight budget," said Kerstin Niblaeus, and she claimed that the new budget

contained a larger increase of research money than the bourgeois governments were able to bring about in recent years. Then the increase was about 2 percent per year.

Shortage of Locations

The question of locations is a bottleneck for research. Here the government last fall already invested 170 million kronor in new professors and new locations, including a chemical institute at the Technical University in Stockholm, computer locations in Linkoping, and locations for semiconductor research at Lund.

The importance of research to the new government is indicated by the placing of the responsibility in the cabinet. Another indication, said Kerstin Niblaeus, is bringing the scientists closer to the politicians. Following the change in government, both cabinet members Ingvar Carlsson and Kerstin Niblaeus have had close contacts with the scientific community, both out in the field and through visits in Government House.

Increased Coordination

"It is very important that scientists have easier contact with the government," said Kerstin Niblaeus, who also believes that it would be good if they sat together in the different committees dealing with research questions. In this way the different departmental questions would not be isolated.

"There has long been a need for coordination," said Kerstin Niblaeus.

"International experience shows," she said, "that an overall science minister will be left hanging in the air if he does not have his own budget responsibility. Therefore the responsibility for the half billion which is going to the scientific advisory council is being transferred to Ingvar Carlsson."

The half billion, which is now increased by about 50 million, is "strategic, flexible money" which can be invested in the most appropriate places. But there the government still has no real freedom of maneuver: the activity is still decided by the 3-year plan of the previous bourgeois government. Even if the differences in viewpoints on research and development are not great between the bourgeois parties and the Social Democrats, it will not be until the spring of 1984 that the new socialist government can seriously put through its own research plans. Then it will be time to create a new 3-year plan.

A new research committee has also been created. It was previously begun by Tage Erlander in the 60's, but gradually became defunct. Ingvar Carlsson and Kerstin Niblaeus are now considering how that happened, and what a new committee should look like. The computer industry has already been pointed out by Ingvar Carlsson as a highly interesting area.

9287
CSO: 3698/161

SCIENCE POLICY

SWEDISH RESEARCH BUDGET GETS APPROVAL OF SCIENTISTS

Stockholm NY TEKNIK in Swedish 13 Jan 83 p 3

[Article by Christer Larsson: "The Budget is Approved"]

> [Text] The government gets approval. For the first time in many years, comments on the research and technical development section of the budget were positive among the institutions and authorities which are concerned with the budget proposition. This is the finding of a telephone poll conducted by NY TEKNIK.

Altogether the appropriation for research and technical development is increased by nearly one billion kronor in the next budget year.

"We have been given nearly everything we asked for," said Bertil Klebby at the National Office for Space Activity. "We can do everything we planned."

Strengthening

"This is clearly a strengthening, no matter how it is calculated," said Professor Ingvar Lindkvist at the Natural Science Research Council. The government itself, through Minister Ingvar Carlsson, said, "Sweden must be able to afford these important future investments even in difficult times."

The Technical Development Administration (STU), the Industrial Fund and the energy research program will together receive nearly 1.3 billion kronor. That is an increase of 59 million kronor. The minister of industry urged STU to especially expand the system of inventors' stipends. Investment in space research and space technology continues. The largest single investment involves the Nordic telesatellite Tele-X, which will get 348 million kronor in the next budget year.

Research

The Research Council will get a total of 85 million kronor more than last budget year. Research and scientific education within the education depart-

ment will get 210 million in increased resources. Biotechnology, electronics and computer technology are three areas to which the government will give high priority.

"Despite industry's own investments having increased considerably during the past decade, the need is great for government development support," said Minister of Industry Thage G. Petterson.

"That means primarily support to the risk-filled projects within the advanced technical areas."

9287
CSO: 3698/161

COMMENTARY ON NATIONAL AGENCY FOR IMPLEMENTATION OF RESEARCH

Paris LE MONDE in French 2 Jan 83 p 6

/Article by Hubert D'Erceville/

/Text/ It is the PME [Small-and Medium-Sized Businesses] which are being helped by ANVAR /National Agency for the Implementation of Research/, in addition to founders of businesses. The criteria for selection are complex, but the selection process does not overlook the potential of the project for creating jobs.

French industrial leaders began to perceive the interest and applications of microprocessors in 1974. They needed 50 million francs for their research. They were unable to get any financial assistance. Today the ministry of research and industry will have to spend 2.5 billion in order to try to catch up in the field of microcomputers, where the Americans and Japanese are in the lead.

This story and a great many others show that innovation really does exist in France, but it also shows our inability to handle it effectively. Both of these factors helped to bring about the founding of ANVAR, a government establishment with an industrial and commercial nature*. "The mission of ANVAR, which operates under the control of the Ministry of Research and Industry, is to help implement the results of scientific and technical research and to promote innovation and technological progress on a national level," stated decree no 79.615 of 13 July 1979.

In reality, this decree marks the second birth of this organization: ANVAR was founded in 1968 in order to promote the work of government laboratories, primarily those of the CNRS /National Center for Scientific Research/. The intention

---

* Located at 43, Rue Caumartin, 75436 Paris. CEDEX 09. Tel: (1) 266-93-10.

was to provide them with industrial outlets and help businesses to make use of these facilities and their work. How does ANVAR work, and what is it financing today?

"Since 1979, ANVAR has had a much more ambitious mission: to foster innovation, whether it comes from government laboratories or not, by means of a system of subsidies and loans," explained Philippe Rognon, deputy director general of ANVAR. To do this, the agency uses two methods.

The bonus for innovation is still designed to encourage PME to make use of the approximately 250 approved public, private, or collective research organizations in France. ANVAR reimburses 25 percent of the cost of investments (with a ceiling of 1 million francs) needed for research conducted by study organizations or laboratories outside of the enterprise itself.

A Careful "Investigation"

The second type of aid, "aid for innovation," is a sort of "partnership" contract signed with "businesses, laboratories, associations, independent inventors, craftsmen, and even secondary school or university-level classes or groups" which wish to conduct an applied research project on their own. This contract provides an interest-free loan for a duration of 5 to 6 years, for a maximum of 50 percent of the cost of the program. This loan is repayable to ANVAR if the product is commercially successful.

While the first, purely administrative step takes at most 1 to 2 months, the second is a more complex procedure, which includes an "investigation" and a precise analysis of the application by experts. "We receive everyone," says a "charge d'affaires" /loan officer/ of ANVAR, but just one meeting in three will lead to the preparation of an aid application." It is required that the applicant deal with a "charge d'affaires," who is the only person authorized to present applications to the "allocation commission."

Each application is studied on the basis of three criteria.

a. A technical analysis studies its new features and the project's technical value.

b. An economic study considers the situation of the industrial sector concerned; one criterion is whether or not it will help to "win back the domestic market."

c. Finally, the ability of the applicant to carry out the program and handle the necessary development of the organization's structures is considered.

Early Elimination Without Prior Requirements

These elimination rounds, which theoretically have no prior requirements, are designed to eliminate program overlapping, meaningless innovation, to exclude enterprises whose financial status is considered shaky (in most cases, these are companies which do not have sufficient matching investment funds), and also to weed out any project which seems unsound or is considered too daring.

Based on these criteria, the "charge d'affaires" decides the fate of the application. Theoretically the applicant can ignore his advice, but the applicant is obliged to deal with the "charge d'affaires," and his influence is such that, practically speaking, going against his opinion causes the application to be turned down.

Once this milestone has been passed, a dual evaluation is made of the proposal. Outside, independent specialists give their opinion about the product's chances for success, and the cost and time required for its success on the market are evaluated.

Christian Marbach, ANVAR's director general since 1979, explains: "We participate only marginally in very large programs, which receive direct encouragement from the ministries concerned. It is always the enterprise which selects its innovative projects; it finances them, at least to the level of 50 percent. We make sure that the projects chosen are related to technological progress, we make sure that there is some coherence between the project and the enterprise, and between the project and its financing."

About 2 to 3 months after the application is filed, a regional commission (for projects with a cost under 1 million francs) or a national commission (for projects with larger budgets) issues a recommendation, and the regional delegates or Christian Marbach, as the director general, issue the final decision.

Doesn't concentrating so much responsibility in the hands of a single man run the risk of distorting ANVAR's prime mission, by impoverishing the variety of projects selected, which must be approved by a single individual?

This concentration has been the target of a great deal of criticism. Some people, without offering any proof, have

spoken of "under the table payments" made to the "charges d'affaires" to favor an applicant. Others have mentioned the case of experts who act as both judge and plaintiff, because of their contacts with the competition, or their professional activities. But how can an agency be criticized for this personal approach to the decisionmaking process, when too often the inertia, the slowness, and the anonymity of the civil service come under attack? We should also point out ANVAR's "regionalization" (over 80 percent of the projects and over 40 percent of the amount of loans are handled in a regional context).

In a little over 3 years, ANVAR has granted 3,200 aids to innovation, which have led to the creation and marketing of a number of products, both in France and abroad.

The diversity of the innovations aided is considerable. There is the case of the Maisonneuve company in Cerences (Manche department), the former French leader in aluminum milk cans. In 1979, facing the continued and fatal erosion of the company's market, Luc Maisonneuve, its director, began to look for another food container made of aluminum for the company to produce. He thought of the aluminum beer keg for use in bars. At that time, the market for this product was entirely in the hands of foreign suppliers. A "revolutionary" improvement over the existing products (internal welding in order to improve the possibilities of washing and reuse of the keg) was then developed by the company's research office, aided by an ANVAR grant.

To the great detriment of the importers, the "Maisonneuve beer keg," with a new design and a competitive price (190 francs each instead of 240 francs) quickly became a success, and the company has now revived. The same thing happened with some other products, such as the Auda nonskid boots, the movable and bullet-proof bank teller's window made by the Demas company, the Jouans centrifuge machines, and the Pubert motorized cultivator.

Other innovations, despite their somewhat amusing appearance, may also be of interest, such as the hardcooked egg-shelling machine made by France-Ponte, which is useful to some food-processing industries (such as makers of doughs and condiments), the "bean-sheller" made by Carre, the nonalcoholic wine made by Alain and Marc Bonneau, the UHF /Ultra-High Frequency/ weed-killer system made by Danton and Patay, which can eliminate the use of chemicals, and the "submarine glider" of the Atomic Energy Commission (for recreational use). And there are many more examples we could mention. It seems that no particular sectors have been especially singled out for favor.

Few "Regular Customers"

Who are ANVAR's users? There have been 3,452 applicants in a little over 3 years: the great majority of these filed only one application (2,817, or 80 percent); a very small number of them (35, or less than 10 percent) have filed more than four applications. This means that there are very few "regulars" among the agency's customers, and in general ANVAR has provided only a limited, specific, but very valuable assistance.

About 75 percent of the applications filed (4,435 in all) have been accepted. The proportion has continued to rise: it was 71.5 percent in 1980, 73.5 percent in 1981, and 76.5 percent during the first 6 months of 1982. Is this a sign that the applicants have learned how to present their case, that they now know what may be of interest to ANVAR, or is it a sort of self-selection process? Over half of the loans (55 percent) have been awarded to "independents" (with fewer than six employees) or very small businesses (with fewer than 50 employees), 19 percent to medium businesses (100 to 500 employees), and 18 percent to large companies. The bulk of ANVAR's clientele thus consists of the PME.

However, if we look at the amount of the grants allocated, the results are different. While the "regional" grants (averaging 250,000 francs) go to PME, the grants allocated on a national basis are quite different: most of them average about 600,000 francs, but very large grants have been given to a small number of companies. Thus, 18 percent of the enterprises--the largest--receive 46 percent of ANVAR's budget. Another advantage big companies have is that they often have specialists who can prepare top-quality aid proposals for the "charge d'affaires."

In its funding allocation, ANVAR is not insensitive to the possible spinoffs of innovation in terms of jobs. An indication of this awareness is the study mission on the restructuring of employment in Alsace and Lorraine assigned to Christian Marbach by Pierre Mauroy. A successful innovation either stabilizes or creates jobs, even though it may sometimes begin by eliminating jobs. For example, the Zodiac Space company, which made rubber boats, until 1977 had 50 employees. Through some technical innovations, it spread its product line out to include other products for recreation and tourism (such as pools for home use), with ANVAR assistance. It then increased its workforce to 200, and plans to hire another 80 people in the near future.

But while ANVAR is willing to take greater risks when some projects may help to keep jobs, its officials insist: "We will never support a financially unbalanced company. That is not our role."

What are the results of ANVAR's aid grants?

There have been some failures in some companies. These have been primarily due to technical difficulties that were not resolved, resulting in total failure; a poor commercial acceptance (partial failure); or accidents unrelated to the innovation itself (bankruptcies, strikes, social unrest). What is the proportion of such failures? As the first contracts will only reach an end toward 1984, it is still too soon to tell.

In fact, too small a percentage of failure would indicate too much caution on ANVAR's part. This would mean that ANVAR actually financed only those innovations that would have made it on their own. However, a failure rate above 50 percent would mean that the taxpayer's money has been spent on innovations without a commercial future. The margin for maneuver is quite small, but this is the figure that will provide a basis for determining the effectiveness of the formula used.

In 1981 ANVAR made 1,377 aid grants to businesses or companies, 35 to educational projects, and 52 to independent inventors. "The latter category is often quite distressing," said Christel de Renty, a public relations representative for ANVAR. "A lot of inventors come to us with a revolutionary invention--that already exists, or which it would be inconceivable or useless for us to aid."

But the first problem of the independent inventors, whose ideas are not always bad, is generally to provide the 50 percent or more of the financing needed if their project is selected. That is why so many of them go away disappointed, to try to get a larger proportion of their program financed by companies such as Soffinova, associations such as France-Initiative, which is intended to encourage the creation of businesses*, or its subsidiary Finovectron, or they may simply abandon their projects, sometimes leaving them in the hands of foreign multinationals. After all, Commander Cousteau was only able to get his financing from the Americans.

---

* See "A Job Detector," LE MONDE DIMANCHE, 21 November 1982.

Room for the Private Sector

In reality, through its two mechanisms of bonuses and innovation grants, ANVAR helps primarily the PME. It has managed to create special ties with nearly 5,000 French enterprises oriented toward innovation. This may seem low, since the INSEE /National Institute of Statistics and Economic Research/ lists 200,000 PME in France. But we should actually consider this figure in relation to the 12,000 to 13,000 enterprises which say they have an ongoing interest in research.

In any event, the innovation aid grants seem to have been of value and profitable for some enterprises, as well as for the government: in 1981, 350 of them began to pay back the loans they had received; that is a sure sign of success. The 20 million francs paid back will then be reinjected into new aid programs.

Since 1979, the agency's budget has continued to grow. It will be 900 million in 1983, which is almost three times what would have been expected in 1979, and which is also 25 percent above its 1982 budget. That is a sign of confidence in this approach. However, ANVAR is going to change its missions still further. It will take part in "mobilizing programs" in coming years. "These programs will concentrate on electronics, biotechnologies, rational energy usage, robotics, working and employment conditions, and scientific and technical cooperation with developing nations, to which may be added the agricultural and food processing industries, housing and living conditions, chemistry, materials, mechanics, culture, and communications," reported Maurice Allegre, the president of ANVAR's board of directors, who is also director of scientific and technological development and innovation at the ministry of research and industry.

These programs, designed for new technologies, will lead to "invitations for bids" which will complement the present forms of aid. The system has already been put to use. Such an invitation was recently issued on the topic "producing better and polluting less," while a "hiring contract" was signed with designers in order to make their work better known to industry*. With the Data Processing Agency, ANVAR is issuing a request for bids for the use of components in robotics and in the field of automation.

---

* See LE MONDE DIMANCHE of 28 November 1982: "Design Sells Poorly."

These activities are oriented toward the PME, which are known to have a limited capability for innovation. But ANVAR is also trying to stimulate private assistance as well. The banks and credit organizations should have a little more confidence in France's potential for innovation, and should be willing to take some risks. Jean-Philippe Mallet, the president of the France-Initiative association, commented: "Along with Finovectron, we are practically ANVAR's sole private 'competitors'; the banking sector has still not grasped the truth of the proverb: 'Nothing ventured, nothing gained.' ANVAR, even if some of its orientations may be debatable, still remains as an example for the private sector."

In a word, the government can not and should not try to do everything. The private sector should also make a commitment to support innovation: that is the only way to diversify aid to encourage research, to modernize our production apparatus, and help businesses to gain a foothold in the international market*. It is certainly going to take some time to catch up: in 1981, only 51 percent of the French research financed received loans from public or private organizations, while this proportion was 70 percent in 1967, when ANVAR was first established in its original form.

A Catalyst

ANVAR does not aid innovation solely by distributing bonuses and grants. Since 1979, it has prepared a series of documents presenting the different types of aid available for innovation. These documents include "The Proper Use of ANVAR," which deals with aid for marketing the innovative product, etc., as well as publications on the status of innovation in different sectors (textiles, pharmaceuticals, aquaculture, electronics, bio-industry, energy, packaging, chemistry, etc.) and appropriate management methods for innovation and its industrial followup**. In addition, the 22 regional delegates of ANVAR act as catalysts in their regions, promoting actions in favor of innovation, and providing all sorts of information on research.

---

* On this subject, ANVAR, acting in association with COFACE /French Foreign Trade Insurance Company/, covers up to 75 percent of the costs of studies done on foreign markets.

** Most of these documents may be obtained free from ANVAR.

ANVAR is headed by a 15-member board of directors who are representatives of the government, organizations affected by the agency's activities, and the industrial, scientific, and technical communities. The board establishes ANVAR's major orientations.

7679
CSO: 3698/142

SEVEN BILLION FRANCS FOR CNRS IN 1983

Paris LES ECHOS in French 14 Dec 82 p 7

/Text/ For 1983 the CNRS /National Center for Scientific Research/ is presenting a draft budget of 7.028 billion francs. This is a 16.5 percent increase in value and a 7.3 percent rise in volume in relation to 1982 (6.032 billion francs). It includes the creation of 540 new jobs: 320 for scientists and 220 jobs for engineers, technicians, and administrative personnel.

Program allocations (1.777 billion francs) show a 22 percent increase; they will be covered by a government subsidy of 1.7 billion. However, according to the CNRS directors, "these allocations may, as they were in 1982, be subject to some regulation." That year the CNRS, like other scientific organizations, had 25 percent of some allocations frozen by the government, acting in the name of budget austerity.

The allocation of resources differs between sectors, depending on their particular needs. There is an increase in jobs allocated for the "physical sciences for engineers" category (an increase of 7.4 percent in the number of scientists). In resources for laboratories, it is the "life sciences" and "chemistry" sectors which are coming out on top. Their allocations are increasing by 27 percent and 25 percent, respectively. This shows a clear intent to favor an emphasis on biology.

Another intention is to favor interdisciplinary research. All the major interdisciplinary programs (energy-raw materials, medications, environment, volcanic eruptions, oceanography, materials) will have their funding increased by amounts ranging from 20 to 33 percent.

The CNRS is interested in regionalization: a "localization plan" will be examined by its board on 16 December. Another interest is international life: a cooperation agreement with Vietnam is planned.

The CNRS, in conclusion, does intend to take part in the definition of the major orientations of scientific policy. For this reason, but also to promote the results of research, it will strengthen its ties with the major French organizations. Pierre Papon, the director general of the CNRS, intends to sign agreements to create joint laboratories with other research organizations, such as the INRA /French National Institute of Agronomic Research/, INSERM /National Institute of Health and Medical Research/, ORSTOM /Overseas Scientific and Technical Research Office/, and AFME /French Agency for the Mastery of Energy/. It also intends to reach general agreements with the major national enterprises in France.

7679
CSO: 3698/142

TRANSPORTATION

MINISTER SAYS AUTO COMPANIES WILL NOT BE NATIONALIZED

Paris AUTO-INDUSTRIES in French 6 June 83 pp 1-2

[Text] France's Minister of Industrial Research, Mr Jean-Pierre Chevenement, announced in an interview published by L'USINE NOUVELLE on January 6 that Peugeot will not be nationalized.

"Peugeot simply must adapt to the new institutional and corporate environment. Moreover, I believe that the stakes of competition cannot be dissociated from a partnership deal within the company," he said.

"My main concern is to keep the investments needed to introduce new lines of cars and to automate the production processes. This involves Renault as well as Peugeot", the minister explained.

He also reminded us of his skepticism about a possible Brown-Boveri transfer (BBC) of the Electromechanical Company [CEM] to Alsthom. "I cannot but be taken aback by an operation that is likely to end up in the loss of export markets throughout the BBC network and, in significantly higher unemployment figures for factories in France", he said.

"Generally speaking, I would like the overall balance between the public sector and the private sector not to change. The growth rate of the public sector must be natural. The size of the public sector actually does not allow for procedures that are so rigid that they would be an obstacle to normal industrial growth", the minister added.

He stressed, however, that in the case of the CEM, "this concerns internal growth rather than outward expansionism, because the public sector would absorb a private firm. The real problem is that of the moral obligation affecting the role itself of national firms."

Among the numerous themes discussed in this interview, Mr Chevenement brought up in particular the question of capital risks, namely, investment of company funds in new or innovative firms. He pointed out that this capital "is still not enough: 250 million French francs compared to 1 billion dollars in the United States."

If banks must focus more on industrial risks, individuals must be encouraged to invest their savings in this direction. In this regard, the government has not made a decision yet, but specialized investment funds could be generated and, on the fiscal level, incentive measures could be adopted which would be in force at the time of application or when any depreciation is ascertained," Mr Chevenement pointed out.

12204
CSO: 3698/172

TRANSPORTATION

PEUGEOT 205 TO BE INTRODUCED IN FEBRUARY

Paris LE MATIN in French 1 Dec 82 p 10

/Article by Henry Lauret: "The Secrets of the 205"/

/Text/ The Peugeot group is counting on this new model that will come out in February to catch a second wind. LE MATIN reveals its principal features.

The "205" is coming soon, a real godsend for Peugeot. Today LE MATIN brings details on the features of this model whose importance will be primary for the Sochaux trademark. This small sedan is fact carries the hopes of a manufacturer who has successively swallowed Citroen, then Talbot (ex-Chrysler) and who almost choked on them. In an exceptionally upbeat car market despite the crisis (up to 10 percent compared to 1981!), Renault is keeping pace with 38.7 percent of sales from January to mid-November. But PSA /expansion unknown/ is struggling. Peugeot has 12.7 percent, Talbot, 5.4 percent, Citroen 12.4 percent. And the foreign brands are taking advantage of that, of course.

Corporate difficulties have unquestionable troubled the privately owned company. But they do not explain everything. Market competition is tremendous. Adequate products are required to keep up, especially in the category that ranges from the 4 CV to the 7 CV, or the "economy" models to the "compact" models. That range represents over 85 percent of the market. Renault quickly understood the importance of selling the greatest possible number of vehicles in this size range, from the R4 to the R18. The management of Renault is even going to bring out an R11, actually an R9 with hatchback. The launching of the 205 in February, therefore, is of prime importance for Peugeot: this car is going to make it possible to occupy strategic territory. LE MATIN can also reveal that, in order not to be left out in the cold, Citroen, which has just launched the BX, is working feverishly on the Coza project, a 640 Kg "economy car" that will fit into their line just below the Visa, at the end of 1984.

Will it be the true successor of the 204 launched in 1965? At Peugeot, they are fervently hoping so. The 205 (project M 24) that will roll off the line at Mulhouse next February is awaited like the Messiah. On paper its specifications already give it an authentic label of competitivity in the

5/7 CV European market. Judge for yourself: front wheel drive, of course, the 205 will have a two box body, which means a hatchback without protruding trunk. Its weight will be 740 kg, the same as that of the Vera prototype built by Peugeot for the purpose of developing applied research in the direction of fuel economy. The C_L or lift coefficient is the specific beneficiary of this research. It will be 0.34, which is an excellent value in the category of cars where the manufacturer also has to deal with weight, dimensions and passenger space.

The 205 will be offered in three gasoline versions. These motors are basically the same as those of the 104 /Peugeot/ and the Talbot Samba. However, they have been the subject of a new development which improves their overall qualities: the roadability and the economy "pair". The version with a 954 cm^3 motor is obviously aimed at making it possible to offer the 205 at a particularly attractive base price. That must be one of its only virtues on the books.

With the 1,124 cm^3 motor, we get to the heart of the matter. Here is a drive train that has allowed Peugeot to advertise /gasoline consumption/ of 4.6 1/100 km. With almost equivalent weight but with a much better lift coefficient, there is every indication that consumption will be close to 4.2 1/100 km at 90 km/hr at constant speed. These figures are only indicative since they correspond to the technical standards of the UTAC /Automobile and Motorcycle Technical Union/. But they serve as a reference.

The 1,360 cm^2 motor is more or less the top of the line for the group. It already exists in 72 hp and 82 hp versions. Peugeot has chosen a compromise aimed at presenting a quick and high performance model first of all, although it too is relatively economical.

Finally, Peugeot will also market, a little later, a 205 Diesel, by using the new 1,900 cm^3 (65 hp) XUD motor which is already being used in the Horizon and the 305, whose technological quality is unanimously recognized by the specialists.

It is obvious that Peugeot expects to integrate the 205 line into its entire line of products now being nationalized. The challenge for the Sochaux manufacturer is primary: they must impose themselves in a determining segment of the market in France as well as in Europe and one where the 104 sedan did not take the place they hoped for. In its time, the 204 had been attractive precisely because of its technological content. And success sanctioned this technical success. After having absorbed the Talbot brand with difficulty and merged the sales networks, after having audited its losses in Argentina, defined an acceptable solution for Spain, Automobiles Peugeot is recovering with difficulty. The situation in Great Britain and the destiny of Talbot in Iran should be more fortunate, it is being said. But lost years can scarcely be caught up in the automobile industry. The image has suffered and today, the lion /the Peugeot trademark/ has to show its claws. These claws are first and foremost the products, although social problems explain part of the current difficulties. The 104 and, above all, the Samba don't have any

reason to blush when compared to the competition. The 305 with its completely redesigned front drive train is, finally, a very good car. Particularly the diesel version. As for the 205, it should occupy the ground between these two large families of models. That is, in the "territory" that represents overall more than 60 percent of the total market. Peugeot would pay a lot to have a guaranteed success....

9969
CSO: 3698/144

'CARBUROL' IN FRENCH GAS PUMPS IN 1983

Paris L'ACTUALITE in French 9 Dec 82 p 11

/Article by C. Gy.: "Jerusalem Artichoke Gasoline in 1983"/

/Text/ "Carburol", a mixture of gasoline and alcohols, invented in the last months of his ministry by Andre Giraud, is rising from its ashes. During the next 3 years, Fr 500 million are going to be allocated by the ministry of energy to finance several production units for the basic chemical compounds of this mixture. In 1983, the gasoline in service station pumps can contain from 5 to 7 percent additives. Around 1990, France should produce a million tons of synthetic fuels.

Edmond Herve, minister of energy, in presenting his project, stipulated that there would not be special pumps for carburol. The motorist will not know whether he is getting carburol or traditional gasoline. If the oil companies, who get no price break on this new product, refuse to distribute carburol, Herve indicated that he could act "through obligatory means."

In order to understand the importance of the stakes, some basic definitions must be recalled:

Contrary to a widespread belief, carburol cannot be a mixture of gasoline and ethyl alcohol (what is traditionally called "alcohol") in France. In carburol, the alcohol involved is chemically the first of the alcohols, that is, methanol.

Therefore, at least for the moment, it is out of the question that agricultural and wine industry surpluses be sent to the gasoline pumps, as is happening on a large scale in Brazil. Projects involving beets or Jerusalem artichokes have, therefore, not been selected.

On the other hand, the gasoline will still be based on Jerusalem artichokes. Because the methanol-gasoline mixture is relatively unstable, it has to be "bound" with a chemical component. The Giraud program had selected acetone-butanol. And Edmond Herve confirmed this choice since financial support is going to go to the Soustons unit in the Landes /department/ (transformation of corn cobs) and to the one that is going to be built at Attin in Pas-de-Calais (fodder beets and Jerusalem artichokes).

To summarize: in order to obtain carburol, gasoline, methanol and acetone-butanol are needed. The methanol will be obtained from coal (Carling) and the acetone-butanol from plant based matter, including Jerusalem artichokes and beets.

That having been said, the Herve program is less ambitious than the Giraud plan.

While the vocation of Soustons, which is to become a pole with a biotechnological vocation, is confirmed, nothing is planned for the production of methanol from heavy oil residues nor for the heavy methanol pilot planned for the IFP /French Petroleum Institute/ process (that would make it possible to obtain the carburol mixture in a single operation), nor for the pilot for the gasification of wood with oxygen. Nothing either on the unit projected for methanol from Lorraine coal nor on the one projected at Le Havre or at Marseilles from imported coal. In addition, the preliminary objective of the Giraud plan was 1.5 million tons of carburol (10 percent in gasoline around 1984-1985) whereas the Havre plan only mentions a million tons by 1990.

The magnitude of the retrenchment can be measured by emphasizing that the second phase of the Giraud plan projected that, by 1990, carburol needs would occupy 2 million of the 30 million hectares suitable for cultivation in France.

9969
CSO: 3698/144

MBB MAKES LARGE COMPOSITE PRIMARY STRUCTURE FOR AIRBUS

Munich-Ottobrunn MBB AKTUELL in German Sep 82 p 7

> [Text] Europe's largest fixture of carbon-fiber reinforced plastic (CRP) is now under construction at MBB [Messerschmitt-Boelkow-Blohm] in Hamburg. With a length of 13.7 ms and a width of up to 4.1 ms, it is designed for the manufacture of the complete primary structure of an Airbus tailplane assembly from moder fiber-laminate materials. Using this fixture, major components for the tailplane center section are to be built at the same for static-dynamic testing.

Today an Airbus tailplane of aluminum weighs about 1.2 tons. Twenty percent of this weight can be saved, if the same primary structure--over 8 ms high, can be made completely of CRP. The movable part of the tail (the rudder) is already being made using the CRP method of manufacture and is in operation. Work at MBB is now concentrating on manufacturing the load-bearing structure (the entire tailplane center section) from CRP. This undertaking is being subsidized by the BMFT [Ministry for Research and Technology] because of its importance for the future direction of aircraft construction.

Remarkable interim results have been achieved not only in the development and testing of the actual structural components (static testing of the first complex part of the center section began in September), but also in the development of methods of manufacturing. It is examining the philosophy of manufacturing, including the special fixtures that are required for the application of this new technology. The fixtures for CRP structures are also made of carbon-fiber reinforced plastic and resins specially developed for this purpose.

The method of manufacturing also determines that the fixtures must be made of CRP: The basic blocks of each of the CRP structures are modules. These elements consist of one or several layers of resin-impregnated CRP mesh, which are wrapped around a metal core-form and shaped until they dry in the autoclave. The modules must be positioned exactly on the bonding shell. This is done with a module jig, in which the modules are held exactly in the intended position. One step in the autoclave will in future be enough, for example, to "bake" one complete 8-meter high side skin for the Airbus tailplane (one-shot-bonding-technique) from 256 such components plust the planking layers. The aluminum form-cores can then be removed: The CRP component is as strong as metal, but about 20 percent lighter.

Expense in the Manufacturing of Module-Cores Reduced by 40 Percent

MBB in Hamburg has developed a new process for the manufacture of module-cores to hold stringers, in which relatively costly NC or copying manufacturing is avoided. The system points of the external contour (stringer data) are determined by means of the CADAM [Computer Aided Design and Manufacture] graphic data processing system and fed into the processing center. The process is applicable to about 80 percent of the module cores. Manufacturing costs can be reduced by about 40 percent.

Parallel to this, the prototype of a wrapping machine was developed which already meets the requirements of later mass production in principle. Considerable progress was achieved by the development of manufacturing methods in the area of other fixtures. The visible result of this basic work, which began with the definition of special resins, are the two 13.7 X 4.1-meter fixtures of CRP. Using these fixtures, which are unique in Europe, the next step will be to make a complete tailplane center section, which will undergo static and dynamic testing in 1984.

The load-bearing structure of the Airbus tailplane presently consists of about 2,000 individual parts, which are joined by rivets. If it is manufactured from CRP, the same center section, which is over 8 ms high, can be built from only 98 parts, plus the rivets. Each of the two large side skins is joined in a single heat treatment operation in the autoclave. This illustrates that in the two large bonding fixtures for the complexly shaped skins there is a wealth of experience that includes the result of extensive work--on the original and structural model as well.

The most important advantages of CRP fixtures are clear from those for the Airbus--which are unusual even in their dimensions:

--CRP save energy, because it stores less heat than metal, that is to say, the autoclave cylce has a lower heat requirement.

--CRP fixtures are safer, because modern fiber-laminate materials--unlike metal--hardly expand at all from the effects of heat. Fixture and component behave identically.

--CRP is about 45 percent lighter. This makes CRP fixtures better to handle than conventional ones.

--Finally, the best surfaces on CRP components can be achieved with CRP fixtures. A comparable result can only be obtained otherwise at considerably higher expense (for example, using highly polished special metals).

In spite of these remarkable advantages, the use of CRP fixtures is excluded for reasons of cost for areas other than the manufacture of CRP components. This also shows to what extent a future technology is coming into existence here, whose importance for all of aircraft construction will perhaps be compared later with the revolutionary change from wood to metal construction in the 1920's and 1930's.

9581
CSO: 3698/165

LUFTHANSA TO SELL SIX AIRBUSES

Paris LES ECHOS in French 14 Dec 82 p 8

/Text/ Lufthansa will upgrade its fleet in 1984 by selling 6 of is 11 A-300-B2 Airbuses that it has available. At the same time the company is expected to dispose of several 727 aircraft.

The West German airline company, which has not given any details on these operations, stresses that the aircraft to be sold are now being used on short lines. It pointed out at the same time that next year it will receive the first six A-310 Airbuses of the series of 25 aircraft to be delivered from now to 1990.

12204
CSO : 3698/141

'LES ECHOS' LAMENTS POSTPONED LAUNCH OF A 320

Paris LES ECHOS in French 31 Dec 82 p 6

[Editorial by Arnaud Rodier: "Too Much Delay in Launching the A 320 Could Clip its Wings"]

[Text] The Airbus A 320 is being delayed. It will certainly not fly in 1987 as planned. Nothing serious in itself, unless it is the fact that the more the little 150-seat Airbus is pushed back, the more handicaps it accumulates. But, the European consortium cannot avoid launching it.

The plane finally has a motor, the CFM 56-4 proposed by SNECMA [National Company for Research and Manufacture of Airplane Motors] and General Electric. The companies and motor makers can no longer volly the ball indefinitely. The former insist that they cannot select a plane without a motor and the latter refuse to equip a plane without buyers. But the A 320 still has no other customers than Air France. And while Airbus is stepping up its approaches to the most diverse companies, several passenger companies have more or less directly given the A 320 some pretty hard blows.

That is the case with Delta Airlines which just ordered 33 Boeing 737-200's. Airbus was counting on this American company to repeat the exploit of the A 300 with Eastern Airlines. Not because this order could snowball on the other side of the Atlantic but because it represented a symbol. Almost a guarantee. All is not lost, but it will be difficult to catch up. And now British Airways is also abondoning the A 320. Not openly, but it amounts to the same thing.

The British company admits that it is going to need 150-seat planes--18 planes are being mentioned--and is hesitating between the Boeing 737-300 and the McDonnell Douglas DC 8 super 80, eliminating the A 320 de facto because it will not be ready when it is needed. In 1986, or precisely the date the small Airbus was to come out originally.

This time the delay is implicated directly. And this type of reaction is very likely to multiply as the wait is extended.

No one doubts that a market for this type of plane will exist in 1987. But the whole question is how many companies are really ready to but it now. The

crisis in passenger service, reduction of the number of flights, the erosion of airline company profits do not favor heavy investments.

Now, selection of the A 320 is a choice of a long-term commercial policy. A selection of a fleet, not a simple purchase of a replacement. And, at the present time, the airlines are more inclined to navigate in familiar skies. All the more so because their bankers are refusing to back them.

Unfortunately, Airbus Industrie has no choice. It has to really extend its line. A good ten years are required for a plane to make money and the contracts that it is signing now are just beginning to pay something. Airbus will only be profitable when its 750th plane has been delivered. Unlike Boeing, there is no chance of momentarily retrieving with one plane what it is losing on another. It doesn't have enough planes. Whence the importance of the A 320, even if the program is expensive: $2 billion investment. But for Airbus, that implies a better distribution of its financing costs. And a broadening of the consortium. On paper that is easy. Less so in reality. Only the Canadian De Havilland has effectively engaged itself in the program. It is to sign a definitive agreement at the beginning of the year.

But Fokker in Holland and Alitalia in Italy are requiring a lot of persuasion. There is no doubt that the difficulty of finding another launching company is involved to a certain extent. And even if Holland and Italy join Airbus immediately, the industrial responsibilities would still have to be parceled out and the share in the development budgets set. A very delicate redealing of the cards.

The Germans have never hidden the fact that the A 320 interested them much less than the A 300 and the A 310. But that could allow Airbus to pursue other programs such as the TA-9, the TA-11 and the TA-12 actively.

Airbus Industrie is feeling the deep necessity to build a business based on several planes and is perfectly convinced of the long-term utility and success of the A 320. But it is hesitant, under pressure from its stockholders, in the face of the size of the risk. It is difficult to invest against the current, to launch during a stagnant period a plane that will come out at the time of the recovery. And yet that is what has to be done. Lost time can hardly be made up. Too much delay in launching the A 320 could clip its wings.

9969
CSO: 3698/143

FRG: HIGH-SPEED INTERCITY TRAINS PLANNED FOR NEXT DECADE

Zurich NEUE ZUERCHER ZEITUNG in German 14 Dec 82 p 5

/Text/ Fast, 250 to 260 km/hr. Intercity trains are to shorten still more the travel times between Germany's cities. The Deutsche Bundesbahn is setting this goal for the next decade. An appropriate series of tests to try out a new, high-speed propulsion unit has now been concluded. A spokesman for the Bundesbahn confirmed Monday in Munich that running tests of the power truck installed in a locomotive developed by Thyssen-Henschel and BBC have established its full capability for operation at speeds between 250 and 300 km/hr.

Advanced Work on Test Stand

Theoretically, a speed of 500 km/h is possible with this new high-speed drive. On the rolling test-stand of the Federal Railroad in Munich, where the rails are replaced by rollers and an appropriate track condition is simulated, this speed has even been attained. But no one is thinking about the development of such extremely fast trains for the Federal Railroad. They would require special construction and would also be too expensive from an energy standpoint. Rather, the goal of the Federal Railroad is to attain an economical speed and a shorter travel time between the cities of the FRG.

A speed of around 250 km/h is considered to be the optimum by rail experts. The construction of a corresponding rail network will be attempted in coming years. The fastest trains currently in use by the Federal Railroad reach a speed of 200 km/h. However, they can travel at this speed only on certain stretches which have the prerequisites for cruising at this speed. In the FRG at present only around 500 km of tracks is suitable for this speed. The tests with the new high-speed drive were performed on the route Gütersloh--Neubeckum. At present, it is the only route in the FRG which permits speeds of over 200 km/h. The Federal Railroad is currently building a new test route on which much greater speeds will be possible. Between Rheine and Frerum in Emsland, a route shut down twelve years ago is being improved for new maximum-speed tests. The straight route offers all topographical advantages necessary for attainment of high speeds.

Junction with Basel?

The end of the work which requires the elimination of all crossings and an appropriate track support, is expected toward the end of 1983--provided the necessary funds continue to be available. The test program of the Federal Railroad is supported by the Federal Ministry for Research and Technology within the frame of a wheel-rail research project which is to explore the technical and economic limits of the wheel-rail principle (in contrast to magnetic rails and similar types of drives). The research project has been under way since the 1970's and was initially concerned with mathematical-theoretical calculations, and then in its second stage, laboratory tests were begun. Now, in the third stage, practical testing has been taken up.

For instance, this autumn the Federal Railroad began construction of a test vehicle "Intercity experimental" which is to be completed in 1985 for the 150th anniversary of the German Railroad. Simultaneous with the tests on the development of a new intercity network scheduled for the end of the 1980's, the expansion of new routes is intended, on which a speed of 250 km/h will be possible. Corresponding projects are planned for the routes Karlsruhe-Basel, Hamburg-Munster and Hannover-Hamm.

9280
CSO: 3698/137

MBB DEVELOPS WHEEL SET CAPABLE OF 400 KM/HR SPEEDS ON RAILS

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German
14 Dec 82 p 5

[Article: "The Wheel-Rail System Becoming More Efficient"]

[Text] MBB has developed a new type of wheel set for speeds of 400 km/h on rails. It is being tested currently on a rolling test stand of the German Federal Railroad in Munich. The new MBB wheel set is slip-controlled and is said to be able to omit the standard, restrictive stabilization devices in use today. Standard wear-profiles are said to be used, like those in use for freight hauling. In this manner, according to the company, the maximum feasible running speeds are achieved economically in addition to high running efficienty due to a simultaneous reduction in wheel wear. Thus, a stable cruising speed of about 120 km/h can be increased to more than 300 km/h and the running life from a current 300,000 km to much more than one million km.

In particular, MBB states: "The essential operating principle of this new configuration is based on a turn away from the conventional, rigid wheel-set axle, replacing it by a new, rotational level of freedom between the two wheels of one axle. This is achieved through a controlled magnetic-powder linkage which can be operated with various control concepts.

"During the testing, the effectiveness of the slip-controlled wheel sets was demonstrated impressively. For example, the stable driving speed, which was below 100 km/h for one of the investigated wheel-set suspensions with rigid axles, was increased to more than 400 km/h by switching to the 'slip-controlled wheel sets.' while simultaneously improving the shock-absorption. This is a new speed 'world record' for wheel/rail-vehicles with wear-profiles (or without any applied high-speed profiling). The attained cruising speed is limited only by the boundary conditions of the test stand, and not by the wheel set.

"In the meantime, speeds of more than 400 km/h have been attained repeatedly with various control concepts. The use of refined slip-controlled wheel-sets in an MBB-designed high-performance pivot mounting of weight-optimizing fiber-composite material is planned for the second stage of the wheel/rail test and demonstration vehicle which will be placed in service by the end of 1985 and will reach speeds of up to 350 km/h."

9280
CSO: 3698/137

OBSERVER COMMENTS ON VOLKSWAGEN'S USE OF INDUSTRIAL ROBOTS

Paris L'ARGUS DE L'AUTOMOBILE in French 21 Oct 82 p 7

[Unsigned article]

[Text] Where does VW stand now that all of Europe is robotizing its production lines? Unchallenged champion of productivity during the 1950's and 1960's, how did the Wolfsburg giant maintain its competitiveness as it shifted from a single crop--the Bug--to the swarm of its present line?

Part of the answer came during a visit--at breakneck pace, as is traditional throughout the world for plant visits--of the most recent robotized installations at Wolfsburg. Still small, these installations foreshadow the production lines of the "restyled" Golf, which we will see in 1983, but already reveal the direction and (kolossal!) intensity of VW's effort.

Like Renault

It all started in the early 1970's when VW recognized the need to mechanize production for better control of costs and quality. The other fundamental requirement was the flexibility of installations, made indispensible by the vagaries of the market, as well as by a increasingly large product line. The technology of multi-point welders that had been widely used until then, was becoming obsolete through its inflexibility and was opening the way for robots, the only machines that could meet the desired specifications.

"We want the best robots," the technical people at VW stated, echoing all their European colleagues. And just like at Renault, the first tests conducted with commercial equipment caused the VW production executives to redefine their specifications, and to build robots that would meet them. As usual, they wanted to square the circle and have their robot fulfill many, at times contradictory, requirements:

Many utilization possibilities;
Free programming;
Modular construction;
Simple, although highly rigid shape;

Possibility of installation in various positions;
Simple and mostly maintenance-free construction elements;
Repetition precision of plus or minus 1 mm;
Payload of 15-100 kg.

The first VW robots meeting these specifications began to appear in 1975. Today, a second generation of robots is coming to light, using the industrial experience accumulated until now.

Like PSA

The robots we saw at work in Wolfsburg are all-electric ones, mostly welders, and capable of lifting 30 kg in their grips. At VW there is no question of heavy loads, Renault-Acma being forced to resort to hydraulics for their 80 kg capabilities. VW's choice is deliberate, an investigation of the competition having immediately shown that hydraulic robots need a larger infrastructure, are more delicate to operate, wear out, and always end up leaking and losing part of their precision. In their concern to create a simple, multi-purpose, reliable, easy to build robot--the Bug of robotics, so to speak--VW's engineers, like those of PSA, selected electric motor robots. They cannot praise this choice highly enough, and in fact we have seen these rather light robots installed in positions unknown by their counterparts. Their small size and weight also allow clever installations on the ground, with a minimum of infrastructure expenses.

We also admired a heavy-weight materials handling robot, altogether different and based on a parallelogram system often seen at Asea. But most of the robots we saw are of the 30 kg all-electric type, intended for spot welding, but with relatively small diameter electrodes (for robots) and independent transformers (not being used as counterweights to the grip, as in the case of Talbot's Barnabe). A rapid examination of welds on Polo's lateral parts shows good precision but some variation in weld quality.

Already a Large Inventory

Currently, 779 robots are in service, of which 754 in VW and Audi plants in FRG, with 33 having been delivered to foreign customers. At the end of 1982, the total will be nearly 900, and an inventory of 2000 is expected by 1990.

Of course, these are the most advanced, class D robots, and the only ones being entitled to be called robots in Europe; programmable automatic equipment is otherwise rife at VW. The largest user is naturally the Wolfsburg main plant, which with 282 units is ahead of the Audi plants at Neckarsulm (160 VW robots), and Ingolstadt (120 VW robots). In Hanover there are 79, with 54 in Emden, 21 in Brunswick, 19 in Kassel, and 9 in Salzgitter; the subsidiaries are also beginning to receive them, with 21 at Volkswagen of America, 3 at VW Bruxelles, and 2 at VW Mexico.

Their major areas of utilization are spot welding, as well as the application of undercoatings, materials handling, and continuous welding. If they were being sold on the market they would cost from 120,000 DM (about 336,000 F) to

220,000 DM (about 616,000 F) depending on the number of possible axes, that is, the quality of their grasp. Given their strength, they are within their price range, but given that these 30-kg robots end up doing as much work as much more expensive 80-kg ones, we can see that VW is modernizing its production tooling by spending less than its competition and by depreciating its home-made robots more rapidly.

A Complete System

As a rule, welding robots work in pairs on both sides of assembly lines, an arrangement derived from lines manned by humans. While waiting for walking robots capable of working on bodies that move continuously before them, robotized lines require a massive system to transfer shells from one station to another. This installation of shuttle carrier platforms is ultimately more cumbersome than the robots themselves, and its performance is crucial for assembly rates and therefore for production profitability and flexibility.

At VW, the fabrication of Passat side panels (Hall 4), and the Polo body assembly line (Hall 2), avoid the pitfalls of the line concept. Scattered in small teams of four or six, the robots cover all the area, with the parts to be welded weaving among them on wire-guided carriages.

At the Salon de Paris we saw similar carriages transporting engines at the Renault stand. The VW carriages, moving shells, units, or big side panels, are much larger. This wire-guided transportation system--named FTS at VW--thus uses carriers that bring parts in a fully automatic manner to the machining centers (robots). Each carriage has an on-board computer, two drive motors, and two other steering motors.

Follow the Wire

Guiding antennas in front and back detect the magnetic field of a wire embedded in the floor (induction loop). They thus follow a path preselected by the steering mechanism, which in connection with the on-board computer guides the carriages in a fully automatic manner to the robots. At the end of welding operations, the pilotless carriers move toward the next station, and so on until they are unloaded.

In Hall 4, 18 carriages are loaded and unloaded automatically, with each pannel being solidly and automatically bolted down on the platform. The automatic pilot monitors the data transmission of the six machining centers, each equipped with four spot welding robots. This (sinuous!) line, produces in two shifts 1100 left-side pannels and 1100 right-side panels per day, for five different models. The cycle time per vehicle is 105 seconds.

Hall 2 repeats the same principles, but more efficiently because the automatic pilot in this case operates on several frequencies; in addition, it makes it possible to circulate transversally, representing an enormous economy of space. Flexibility is also increased because the guidance mechanism (of the whole) communicates with the on-board computers of the carriages through a freely programmable command that takes into consideration the data from information points, reference points, and information circuits.

In short, the real time treatment of the multiple information sources makes it possible to organize the routing of the carriages--and thus the work of the robots--in the most economical and rapid manner.

This line was inaugurated in August 1981; by the end of September 1982 it produced 184,000 Polo or Polo Classic bodies. Depending on model, the cycle time is 70-110 seconds, with a maximum daily capability of 1340 units. The FTS route covers 15 welding stations (54 robots) supplied by 30 wire-guided carriages; this original and economical technique, perfectly adapted to the robotization of older plants, is thus also perfectly mastered by VW.

To Go Much Further

As the other robot designers, VW was rapidly faced with the problem of shape recognition, indispensible for supplying transfer machines, and has solved it. The parallel with Renault goes even further: while Renault became associated with Ransburg to create Cybotech, VW has done the same with General Electric Company of Bridgeport, Connecticut, authorizing the latter to manufacture and sell its industrial robots. GE will thus open the American market for VW, which in return, expects information and technologic spinoffs for assistance toward progress. At the industrial level, VW will deliver to VW [in text] robots and components manufactured in Wolfsburg during the five years of the contract.

But if VW wants to--and can--go further in the technical area of robotics, it is because a consensus exists at all levels of the enterprise. We know that by definition VW has union members on its board of directors (Mr Hahn sometimes sends them abroad to handle important matters) and that a robotization policy inevitably results in an unemployment scare: the problem has therefore been carefully studied.

Revealing Figures

In France, Renault states that robots will not take anyone's job, at least at the beginning. Bob Lutz, at Ford, foresees a one percent reduction in personnel. What does VW say?

Tests conducted at VW show that an industrial robot eliminates about four jobs of simple work, and creates a new job of highly qualified work. This observation however, concerns only about 40 percent of all the systems already in operation. The other 60 percent had already replaced mechanical production means, so that the start of their operations had no repercussions on employment.

But it is also expected that the car of 1990 will represent 35 percent more work than today's; the personnel will therefore not be smaller, despite the presence of robots.

By 1990, VW will employ as many workers as today because the robots will absorb the additional volume of work. Higher technology on one hand, and the larger number of robots in service on the other, will therefore balance each

other with the result that the number of workers will not increase. In exchange, the percentage of highly qualified work will increase at VW. It is expected that of the 70,000 workers directly involved in production, the 10,000 responsible (partially or totally) for very qualified work will increase to 14,000 in 1990.

Moreover, a still unknown number of workers which are overqualified for the work they currently do will find much better utilization of their competence. In conclusion, Wolfsburg has understood that robotization--as part of mechanization--is unavoidable for mastering costs, the only way to produce at advantageous prices and therefore to remain competitive over the long term, assuring the survival of the company.

11,023
CSO: 3698/169

FRANCE JOINS COMPETITION TO DEVELOP LIGHT-WEIGHT BATTERY

Paris L'ACTUALITE in French 1 Dec 82 p 10

[Article by Christian Guery: "Lead Soon to be Replaced by Plastics. Batteries: The Revolution is Tomorrow"]

> [Text] If the research underway is favorable, French motorists will have completely plastic batteries, without lead, by 1990. With, as a direct consequence, a weight savings of over 50 percent and a reduction in the [gasoline] consumption of vehicles. That is the result of an innovation developed by the European Battery Company (CGE [General Electricity Company] group) and the Atomic Energy Commission.

The battery and accumulator industry has forever seemed unchangeable, while sectors such as electronics and plastics were announcing invention upon invention. If the electric car has never made it, it is, to a large extent, because of the weight and short range of the batteries. The conquest of space had given hope for great progress, thanks to fuel batteries. A vain hope.

Promising Solutions

However, research teams had not quit. Several promising solutions are finally beginning to get on the drawing boards. Thus the CEA [Atomic Energy Commission] and the European Battery Company have decided to unite their efforts to study batteries made of "conducting polymer plastics."

It is a matter of studying the development of a new generation of batteries where plastic will replace lead. This new product could be marketed between now and 1990 and contribute to the success of the national program of thermal vehicles with low gasoline consumption (3 liters per 100 km). The development of organic batteries has been made possible by the progress of organic electrochemistry and by the study of the physical properties of organic polymers.

The advantages of accumulators with organic components are many: technically, the mass power is high which, concretely, makes it possible to obtain four times more than with lead accumulators. In addition, this type of generator operates at ambient temperature and its cost should not be prohibitive. The

fact is that there are still many problems of application to be solved before there can be any hope of marketing it. Therefore, considerable progress is still necessary to obtain chemically stable and efficient accumulators.

Composite Materials

Other research directions have been explored, but appear less promising at least in the short term. Research has been carried out by the CGE in collaboration with the CNRS [National Scientific Research Center] and the Brochier company to develop lead-based composite materials reinforced with ceramics. The lead impregnates the core of the fibers, which is not a small problem to be solved to produce this type of batteries industrially.

This process begins with a chemical coating of the fibers by copper, an operation which makes the strands of composite materials conducting and allows them to next undergo an infiltration of lead by electrolytic deposit. The fibers tested are silicon or carbon carbide. There again, the weight reduction is significant. And information from the CNRS mentions possible applications in electrical traction.

These two pieces of information, very different in nature, show that innovation in this sector is entering a new cycle, to the extent that plastic batteries seem closer to industrial application. It should be noted that the American company, Allied Corp, has also designed organic component accumulators in which the polymer used was polypraphenylene. For its part, IBM has synthesized and doped polypyrole electrochemically, an important step for the development of plastic accumulation parts.

In France, it is important to point out that the CGE group and its subsidiary, the European Battery Company, are involved in the current developments. In fact, this firm is known by its brands Fulmen, Tudor and Dinin and is the largest French manufacturer of lead batteries.

Among its other research that has made it possible to develop efficient products can be mentioned maintenance free batteries, water tight accumulators. A new generation for electric vehicles, whose endurance has been tripled is being experimented in the laboratory.

9969
CSO: 3698/143

BRIEFS

A-320 ENGINE--Charles Fiterman concluded in Tarbes that the SNECMA proposals for the A-320 Airbus engine "were good." "Funds are provided this year to start construction of this engine as soon as all requirements are met," the Transport Minister added while addressing elected officials and important persons in the Upper Pyrenees department following an inspection tour at SOCATA [Tourism and Business Aircraft Manufacturing Company]. [Text] [Paris LES ECHOS 12 Jan 83 p 9] 12204

A-310 SALES--Sudan Airways might buy 3 short- and medium-distance Airbus A-310 Mail Coaches. The Airbus Industry refuses to comment on this information. However, according to Flight, a specialized British magazine, the company has just signed a letter of intention for these three aircraft at a price of 250 million dollars, with delivery in 1984, if the order is confirmed. [Text] [Paris LES ECHOS 13 Jan 83 p 11] 12204

CSO: 3698/172 END

END OF FICHE DATE FILMED

3-4-83 B